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Findings of this study of approximately 2,200 freshmen enrolled in Trinity College and Woman's College of Duke University in the fall terms 1951, 1952, and 1953, indicate that:

1. Students (both men and women) who have identifiable educational goals appear to be better prepared for college (in terms of student placement test performance) than those who do not.
2. Men students with educational goals appear to go better in college than those who do not have such goals.
3. Women students do about equally well in college, whether they have educational goals or not.

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The Relationships Between Choice of a Major Field of Study and Academic Preparation and Performance

HENRY WEITZ, MARY CLARKE, AND ORA JONES

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THE RELATIONSHIPS BETWEEN CHOICE OF A MAJOR FIELD OF STUDY AND ACADEMIC PREPARATION AND PERFORMANCE

HENRY WEITZ
MARY CLARKE
AND
ORA JONES
Duke University

If entering college freshmen who express a preference for a major field of study are better prepared for college than those who express no such preferences, and if students with clearly defined educational goals perform better in college than those who have no such goals, then these relationships would have important implications for college admissions officers and secondary school guidance workers. The present investigation considered these relationships and tested the following three hypotheses:

I. Students who express a preference for a major field of study in college are better prepared for college than students who express no such preferences.

II. When preparation for college is held constant, men students who express a preference for a major field of study perform better in college than do men students who express no such preference.

III. When preparation for college is held constant, women students who express a preference for a major field of study perform about as well in college as women students who express no such preference.

Procedure (First Phase)

During the Orientation Week which precedes the opening of classes, all freshmen at Duke University participate in a Placement Testing Program which includes a test of scholastic aptitude (6) and achievement tests in reading (8), mechanics of English expression (7), and mathematics (9).

At the time these tests are administered, the students prepare Test Record Cards on which they record, among other things, their proposed major field of study and their proposed vocational objectives. The students are instructed to write "Not Sure" if they have not decided on either of these choices.

For the purposes of the present investigation, only those freshmen enrolling in Trinity College (the undergraduate liberal arts college for men) and Woman's College (the undergraduate liberal arts college for women) were included.[1] In all there were 2192 students who enrolled in Trinity College and Woman's College in the Fall Terms of 1951, 1952, and 1953, and for whom complete test records were available. This population was divided into three major groups as follows:

Group A. Students who recorded "Not Sure" for both major field and vocational objective.

Group B. Students who expressed a fairly clearly identifiable preference for a major field of study in one or more of the following ways:

1. They listed a major field of study.
2. They listed a vocational objective for which undergraduate or pre-professional training is available at Duke (as, for example, law, medicine, dentistry, social work, teaching).
3. They listed a major field or vocational objective in which Duke offers closely related training (as, for example, journalism choices, which were assigned to English).

Group C. Students whose major field of study was inappropriate at Duke because training is not available (as, for example, architecture) or who recorded "Not Sure" for their major field, and who listed two or more vocational objectives for which there was no common training at Duke (as, for example, law and medicine).

In view of the fact that Group C represented a kind of "mixed" motivational group it was omitted from the study. The final experimental population, then, for the first phase of the study consisted of 2111 freshmen who entered the liberal arts colleges of Duke University in the Fall Terms of 1951, 1952, and 1953, and who either indicated an identifiable pref-

[1] Students enrolling in the schools of Nursing and Engineering were excluded from this study.

TABLE 1
Distribution of cases

Group	Major Field Preference Indicated	Major Field Preference Not Indicated	Total
Men	945	374	1319
Women	351	441	792
Total	1296	815	2111

erence for a major field of study or indicated no preference for both major field of study and vocational objective. The distribution of cases is reported in Table 1.

The Findings (First Phase)

A previous study (3) conducted with these Duke University students suggested that it would be inappropriate to combine data for the men and the women even though they attend substantially the same classes. Consequently, in this first phase of this study the data from the two groups are treated independently.

Differences in preparation for college work were estimated in terms of student test performance on the Placement Tests. These tests provide measures of scholastic aptitude and achievement in selected crucial academic areas. Numerous studies have demonstrated the general relationship between these measures and academic performance in college, and an unpublished investigation by Weitz and Droege (4) validated these general findings locally.

The differences in performance on the Placement Tests are reported in Table 2.

The following major factors are evident in the data presented in Table 2:

(a) All differences in Placement Test performance for both men and women are in favor of the students who expressed a preference for a major field of study.

(b) In the case of the men, all but two of these differences were statistically significant at the one per cent level, and all but one were statistically significant at the five per cent level.

(c) In the case of the women, only half of the differences

TABLE 2

Mean Placement Test Performance

Test	Mean Scores: Preference Indicated	Mean Scores: Preference not Indicated	Difference
Men	(N = 945)	(N = 374)	
Scholastic Aptitude			
Quantitative	44.72	44.07	0.65
Linguistic	71.17	67.86	3.31**
Total	115.92	111.93	3.99**
Reading	59.02	57.29	1.73**
English	54.10	52.78	1.32*
Mathematics	19.85	18.51	1.34**
Women	(N = 351)	(N = 441)	
Scholastic Aptitude			
Quantitative	45.82	45.70	0.12
Linguistic	82.71	79.49	3.22**
Total	128.60	125.14	3.46*
Reading	65.58	63.45	2.13**
English	64.34	63.97	0.37
Mathematics	19.48	18.53	0.95

* Differences are statistically significant at the 5% level.
** Differences are statistically significant at the 1% level.

were statistically significant at the five per cent level or better, and, in terms of the traits for which these differences were found, it is possible that the differences all have a common factor source.

Thus we may say that, in general, entering college freshmen who express a preference for a major field of study, under the conditions herein defined, tend to be better prepared for college in terms of the test measured characteristics studied than those who express no such preferences. The differences obtained seem to suggest that the relationship is more clearly identifiable in men students than in women students. These data tend to support Hypothesis I.

Procedure (Second Phase)

In the second phase of the study the relationship between educational choice and academic performance was investigated. In this phase of the study samples of 100 students who expressed a preference for a major field of study were matched with 100

students who had expressed no such preference, and their differences in academic performance were studied. Separate investigations were made of men and women students using the same techniques.

Samples drawn from the original experimental populations were first matched on seven levels of academic preparation based upon their performance on the Placement Test of Scholastic Aptitude. Lindquist's method of selecting the samples (1, p. 128) was used in order to insure that the samples drawn were representative of the distribution of academic ability found in both parent populations. These parent populations were defined as (a) all 1319 men in the original group, or (b) all 792 women in the original group.

When the samples of 100 students were matched with respect to scholastic aptitude, it was found that they were also matched, substantially, with respect to all test measures. Table 3 reports the mean test scores, differences, and critical ratios of the differences for the matched samples, for both men and women. The critical ratios of the small differences which do appear

TABLE 3

Mean Placement Test Performance of Matched Groups of Freshmen

Test	Mean Scores			Critical Ratio of the Differences
	Preference Indicated	Preference not Indicated	Difference*	
Men	(N = 100)	(N = 100)		
Scholastic Aptitude				
Quantitative	44.05	45.70	−1.65	1.20
Linguistic	71.50	68.95	2.55	1.27
Total	114.75	114.55	0.20	0.07
Reading	58.25	57.35	0.90	0.79
English	53.30	53.00	0.30	0.21
Mathematics	19.50	19.25	0.25	0.20
Women	(N = 100)	(N = 100)		
Scholastic Aptitude				
Quantitative	44.80	46.25	−1.45	1.12
Linguistic	81.90	80.90	1.00	0.52
Total	126.75	126.70	0.05	0.02
Reading	65.55	64.40	1.15	1.00
English	64.50	64.60	−0.10	0.10
Mathematics	19.85	19.60	0.25	0.23

* Positive differences are in favor of the group expressing a major field preference.

between the groups are of such a magnitude as to suggest that the differences are due to chance factors.

For purposes of this investigation, academic performance was defined as the number of quality points earned during the first semester of the freshman year. At Duke University, quality points are awarded as follows: for each semester hour of A, 3; for each semester hour of B, 2; for C, 1; for D, 0; and for F, −1. The total of quality points earned in any semester, therefore, is the algebraic sum of the numerical equivalents of the grades times the number of semester hours of credit allowed for the course in which the grade was earned. This total quality point standing is reduced in a minor way for those students who have excessive absences. Observations of the records suggest that the subtraction of quality points for excessive absences would have so little influence in this study that no effort was made to correct it. The number of quality points earned during the first semester ranged from −17 to 49 for men, and from −4 to 54.5 for women.

Quality points earned in the first semester only was chosen as a measure of academic performance because it was felt that some students would choose a major during the second and subsequent semesters, and that this choice might influence their performance. Thus only the first semester was considered appropriate for an investigation of the influence of choice on performance. Yet it is suspected that even here some measure of contamination existed.

An analysis of variance using a treatment by levels design described in Lindquist (1) was used with seven levels and two groups.

The Findings (Second Phase)

For the men, it was found that those expressing a preference for a major field earned a quality point average of 19.04 while those who expressed no such preference earned a quality point average of 14.51. The difference of 4.53 quality points was significant beyond the one per cent level. Although the group by level interaction was not found to be statistically significant, observations of the data suggest that the preponderance of the differences occurred at the middle levels while the extreme levels showed little difference between the groups.

For the women, it was found that those expressing a preference for a major field earned a quality point average of 26.00 while those who expressed no such preference earned a quality point average of 24.90. While this difference of 1.10 quality points was in favor of those expressing a preference, it was not statistically significant. Similarly the group by level interaction was not found to be statistically significant.

Thus the findings tend to support Hypotheses II and III, and to provide the additional information that the differences which do appear (in the case of the men) were unrelated to the group by level interaction. Men who have educational goals, then, do perform better in college than men who do not. Women who have educational goals may perform better than women who do not, but the evidence presented here gives only little assurance that they do.

Conclusions

The following relationships were found in an investigation of the relationships between the choice of a major field and academic preparation for college and academic performance in college:

1. Students (both men and women) who have identifiable educational goals appear to be better prepared for college than those who do not.
2. Men students with educational goals appear to do better in college than those who do not have such goals.
3. Women students do about equally well in college whether they have educational goals or not.

Comments and Implications

The reader must have recognized from the outset that the method used in determining the student's choice of a major field of study or his lack of such choice permits a great deal of uncertainty as to the validity and strength of the choices listed. It is well recognized that some students who list major fields of study under the conditions described above may well be less sure of their choices than students who record "not sure," but who are considering some possibilities with considerable conviction. While this possibility is accepted by the investi-

gators, they feel that a more precise division of the students in terms of real major field choices would simply have made even more evident the differences which were demonstrated.

It should further be noted that this study made no attempt to ascertain the degree of stability of a major field choice. This reflects the underlying hypothesis which holds that any choice of any degree of stability has an influence different from no expressed preference.

One fruitful line of investigation which might lead from the present study would be to identify the nature of the relationships between the factors studied here. It would be tempting to say that the reason students with expressed preferences are better prepared for college than those without expressed preferences is that the preferences act as a motivational device which makes it possible for the "sure" students to integrate their learning experiences more effectively, thus producing better test performances not only on achievement tests, but also on scholastic aptitude tests. Yet there is no more reason to believe this to be true than to believe that better prepared and more able students are the kinds of people who make up their minds about such things as major fields. Thus although this investigation has shown that a relationship exists, it has contributed little to the understanding of the nature of this relationship. Care must, therefore, be exercised not to interpret these data too broadly even if they do apply to situations outside the specific academic community studied.

Another aspect of these findings which provides material for speculation is related to the differences among men and among women students. Why, for instance, are the differences between "sure" and "not sure" students, wherever they exist at all, always greater in the case of the men than in the case of the women? If we can reasonably say that the nature of the relationships found has something to do with motivation, then we can begin to see some of the influences of sex-typing in our culture. The argument might go something like this: Our society trains its young to believe that it is "manly" to be motivated by clearly defined educational (and vocational) goals, but "womanly" to be motivated by the sheer joy of learning. Thus young men require specific educational goals

to prepare and perform well, while women require only an opportunity to learn. Other guesses as to the dynamics of these relationships would, of course, be equally tenable.

No matter what the relationships, however, one implication for college admissions officers seems clear. They would be well advised to ask their candidates for admission to record their choice of a major or lack of such choice on their application forms, and where the question of admission needs to be resolved between two equally good candidates, it can be resolved in favor of the one with a choice. This appears to be especially practical in the case of men, and especially those who fall in the middle range of ability. Of course, this policy may do some violence to the liberal arts college tradition which holds that a student should choose a major only after he has had an opportunity to explore the curriculum for half his college career before concentrating his efforts on educational experiences which utilize his most highly developed talents and which stimulate his interests.

The second implication of this study is not so clear cut. If the relationships disclosed here are genuinely those of motivation, then there might be some value in secondary school guidance workers making a genuine effort to encourage college preparatory students to choose their major field of study early. In this way the students might be expected to prepare themselves more adequately for the "right" college and to perform better when they get there. The dangers inherent in this procedure are, of course, too numerous to consider here, yet it is possible that at worst this procedure might give a slight advantage to the positive outcomes over the dangers.

Summary

There is little in the literature suggesting a major effort to study the particular relationships discussed here. For the most part the studies are concerned with the influence of vocational choices, rather than major field choices, on academic preparation and performance. Yet we might anticipate the influences of educational and vocational life goals to be the same or similar.

Zorbaugh and Kuder (5) in a study of the influence of occu-

pational choice upon academic performance of women when the effect of intelligence is factored out concluded that whether a student has chosen an occupation makes no appreciable difference. To this extent, the present study appears to suggest that occupational and educational goals have about the same influence on women, namely, none. Zorbaugh and Kuder, however, suggest that the findings might be different for men. The present study tends to verify their guess.

Marshall and Simpson (2), on the other hand, working with 270 male college students found that college students with *definite* vocational choices ranked relatively mediocre on academic aptitude, but mediocre and high on academic performance; that students with *tentative* vocational choices ranked high on both aptitude and performance; and that students with no vocational choices ranked low on both. When only the first semester's performance is considered in this study, we find that the "no choice" group exceeded the "definite choice" group in both aptitude and interest. The differences, however, were small and probably not significant. This study suggests that the influence of vocational objectives on the academic performance of men may not be significant. If this is true, we may conclude either that educational and vocational choices exercise a different influence on academic performance, or that the design of the Marshall and Simpson study was so different from the present study that no comparisons can be made.

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